US007884331B2

(12) **United States Patent**
Majewski et al.

(10) **Patent No.: US 7,884,331 B2**
(45) **Date of Patent: Feb. 8, 2011**

(54) **COMPACT AND MOBILE HIGH RESOLUTION PET BRAIN IMAGER**

(75) Inventors: **Stanislaw Majewski**, Yorktown, VA (US); **James Proffitt**, Newport News, VA (US)

(73) Assignee: **Jefferson Science Associates LLC**, Newport News, VA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 54 days.

(21) Appl. No.: **12/284,285**

(22) Filed: **Sep. 19, 2008**

(65) **Prior Publication Data**

US 2010/0288935 A1 Nov. 18, 2010

(51) **Int. Cl.**
G01T 1/161 (2006.01)

(52) **U.S. Cl.** **250/363.04**

(58) **Field of Classification Search** 250/363.03, 250/363.02, 363.04
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,980,552 A 12/1990 Cho et al.
6,697,660 B1 2/2004 Robinson
2004/0008810 A1* 1/2004 Nelson et al. 378/19
2005/0082486 A1* 4/2005 Schlyer et al. 250/363.01
2006/0284095 A1* 12/2006 Muehllehner et al. .. 250/363.02

OTHER PUBLICATIONS

Moehrs et al, A detector head design for small-animal PET with silicon photomultipliers (SiPM), 2006, Phys. Med. Biol. 51 1113-1127.*

* cited by examiner

Primary Examiner—David P Porta
Assistant Examiner—Marcus H Taningco

(57) **ABSTRACT**

A brain imager includes a compact ring-like static PET imager mounted in a helmet-like structure. When attached to a patient's head, the helmet-like brain imager maintains the relative head-to-imager geometry fixed through the whole imaging procedure. The brain imaging helmet contains radiation sensors and minimal front-end electronics. A flexible mechanical suspension/harness system supports the weight of the helmet thereby allowing for patient to have limited movements of the head during imaging scans. The compact ring-like PET imager enables very high resolution imaging of neurological brain functions, cancer, and effects of trauma using a rather simple mobile scanner with limited space needs for use and storage.

15 Claims, 5 Drawing Sheets